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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
LE, JOHN H	

ART UNIT	PAPER NUMBER
2863	

DATE MAILED: 06/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

A·A

Office Action Summary	Application No.	Applicant(s)	
	10/044,154	ERYUREK, EVREN	
	Examiner	Art Unit	
	John H Le	2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02/05/2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19,21-34,37-41 and 44-53* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *37-41 and 44-53* is/are allowed.

6)☐ Claim(s) *1-9,12,18,19,21-25,28 and 31-34* is/are rejected.

7)☒ Claim(s) *10,11,13-17,26,27,29 and 30* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *08/18/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

R sponse to Amendment

1. This office action is in response to applicant's response received on 02/05/2004.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-4, 6, 8, 12, 21-25, 28, and 37 are rejected under 35 U.S.C. 103(a) as obvious over March (USP 6,490,506).

Regarding claims 1 and 21, March teaches a monitoring system for use in estimating the existence of cavitation in a device (e.g. Col.5, line 53-Col.6, line 5), the monitoring system comprising: a processor 76; a memory 80 that stores a characteristic curve for the device; a collection routine adapted to be executed on the processor to collect one or more operating parameters associated with the device during operation of the device; and a monitoring routine adapted to be executed on the processor that uses the one or more operating parameters (Fig.3)(e.g. Col. 8, lines 12-41). March discloses hydraulic performance for a hydroelectric unit such as unit 18 is typically characterized by a series of curves showing hydraulic efficiency as a function of gate opening or output power for a series of heads representing the expected operating range (Col.12, lines 52-56), a curve 112 indicates the vibrations (as measured by a vibration sensor 64' shown in FIG.4) in turbine guide bearings 110 as a function of power level for all three units 18 during normal operation over the entire operating range of facility 16 (Col.14,

lines 49-53). For the purpose of controlling operation of unit 18 and monitoring economic impact of operating facility 16 at levels other than predetermined reference levels, the sensors of control system 46 preferably permit detection of a set of operating parameters, including gross differential head from headwater 24 to tailwater 26, power generation level, flow through unit 18, cavitation, and trash rack head loss. While a number of alternative methods are known in the art for directly or indirectly measuring the foregoing parameters, preferred sensing devices include the following. Appropriately placed stilling well-type transducers 50 and 52 measure the relative elevation or height of headwater 24 and tailwater 26, respectively. Such measurements are used to determine the drop in head across dam 12 and for determining the submersion factor of the turbine as an indication of the risk of cavitation within turbine 30 (Col.5, line 53-Col.6, line 2).

Although March is silent on teaching of the claimed the characteristic curve to estimate the presence of cavitation within the device, it would have been obvious to one of ordinary skill to apply the characteristic curve to estimate the presence of cavitation within the device for the purpose of providing a system for monitoring and control of the operation of a turbine as intended since characterized by a series of curves showing hydraulic efficiency as a function of gate opening or output power for a series of heads representing the expected operating range, the sensors of control system 46 preferably permit detection of a set of operating parameters, including gross differential head from headwater 24 to tailwater 26, power generation level, flow through unit 18, cavitation, and trash rack head loss, such measurements are used to determine the drop in head

across dam 12 and for determining the submersion factor of the turbine as an indication of the risk of cavitation within turbine 30, that some type of the characteristic curve to estimate the presence of cavitation within the device must be present for providing a system for monitoring and control of the operation of a turbine as intended.

Regarding claims 2 and 22, March teaches the memory also stores a model associated with the device and wherein the monitoring routine is adapted to use the model to estimate a further operating parameter associated with the device (e.g. Col.8, lines 12-28, Col.11, lines 41-57).

Regarding claims 3 and 23, March teaches the monitoring routine is further adapted to use the estimated further operating parameter and the characteristic curve for the device to estimate the presence of cavitation within the device (e.g. Col.5, line 61-Col.6, line 5, Col.12, line 52-Col.13, line 10).

Regarding claims 4 and 24, March teaches the one or more operating parameters includes a pressure indication associated with the device and wherein the collection routine is adapted to collect the pressure indication (e.g. Col.6, lines 18-24).

Regarding claims 6 and 25, March teaches the one or more operating parameters includes a fluid flow indication associated with the device and wherein the collection routine is adapted to collect the fluid flow indication (e.g. Col.5, lines 20-23, lines 35-39, 54-60).

Regarding claim 8, March teaches the one or more operating parameters includes a pressure indication and a fluid flow indication associated with the device and

wherein the collection routine is adapted to collect the pressure and fluid flow indications (e.g. Col.5, lines 20-23, lines 35-39, 54-60, Col.6, lines 18-24).

Regarding claims 12 and 28, March teaches interface circuit 78 communicates control signals from central processing circuit 76 to an operator interface 86 for displaying operating conditions, such as the head loss across trash rack 44 or cost values associated with current trash rack losses or other operating parameters. Operator interface 86, which typically includes a computer monitor situated in a control station for facility 16, may also display or sound visual or audible alarms, such as when trash rack losses exceed predetermined threshold levels (Col.8, lines 7-11). Although March is silent on teaching of the claimed alerting a user when the monitoring routine estimates the presence of cavitation within the device, however it would have been obvious to one of ordinary skill in the art at the time the invention was made to teach alerting a user when the monitoring routine estimates the presence of cavitation within the device since the operator interface 86, which typically includes a computer monitor situated in a control station for facility 16, may also display or sound visual or audible alarms, such as when trash rack losses exceed predetermined threshold levels (Col.8, lines 7-11).

4. Claim 5, 7, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over March (USP 6,490,506) in view of Dhindsa et al. (USP 5,846,056).

Regarding claims 5, 7, and 9, March fails to disclose the one or more operating parameters includes a suction pressure indication and a suction fluid flow indication.

Dhindsa et al. disclose the operating parameters include a suction pressure indication and a suction fluid flow indication (Col.5, lines 32-62).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a suction pressure indication and a suction fluid flow indication as taught by Dhindsa et al. in a hydroelectric power generation facility of March for the purpose of providing a control circuit utilizing the cylinder head pressure determines values of certain system parameters, controls the operation of the pump system in accordance with programmed instructions, and activates alarms if the values of certain system parameters fall outside their respective predetermined norms (Dhindsa et al., Col.1, lines 43-49).

5. Claims 18-19, 31-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over March (USP 6,490,506) in view of Dorchak (USP 5,161,110).

Regarding claims 18-19, 31-34, March fails to disclose the monitoring system includes an expert engine, wherein the expert engine is a neural network, the expert engine includes step using a trending analysis, a fractal analysis.

Dorchak teaches the monitoring system includes an expert engine, wherein the expert engine is a neural network (Col.3, lines 55-60/Col.5, lines 54-68), the expert engine includes step using a trending analysis (Col.3, lines 64-67), a fractal analysis (Fig.2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include an expert engine, wherein the expert engine is a neural network as taught by Dorchak in a hydroelectric power generation facility of March for

the purpose of providing a hierarchical process control system, which substantially eliminates or reduces disadvantages and problems associated with prior control systems (Dorchak, Col.2, lines 20-24).

Allowable Subject Matter

6. Claims 37-41 and 44-53 are allowed.

7. Claims 10-11, 13-17, 26-27, and 29-30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 10, none of the prior art of record teaches or suggests the combination of a monitoring system for use in estimating the existence of cavitation in a device, wherein the monitoring system comprising: a collection routine adapted to be executed on the processor to collect one or more operating parameters associated with the device during operation of the device; and a monitoring routine adapted to be executed on the processor that uses the one or more operating parameters and the characteristic curve to estimate the presence of cavitation within the device, wherein the monitoring routine is adapted to determine a net positive suction head available in the device and compare the net positive suction head available with a net positive suction head required associated with the device. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claims 13, none of the prior art of record teaches or suggests the combination of a monitoring system for use in estimating the existence of cavitation in a device, wherein the monitoring system comprising: a collection routine adapted to be executed on the processor to collect one or more operating parameters associated with the device during operation of the device; and a monitoring routine adapted to be executed on the processor that uses the one or more operating parameters and the characteristic curve to estimate the presence of cavitation within the device, wherein the characteristic curve defines a net positive suction pressure required for the device. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claims 14, none of the prior art of record teaches or suggests the combination of a monitoring system for use in estimating the existence of cavitation in a device, wherein the monitoring system comprising: a collection routine adapted to be executed on the processor to collect one or more operating parameters associated with the device during operation of the device; and a monitoring routine adapted to be executed on the processor that uses the one or more operating parameters and the characteristic curve to estimate the presence of cavitation within the device, wherein the characteristic curve is a voltage-current characteristic curve for the device, wherein the one or more operating parameters are associated with electrical operating parameters of the device and wherein the monitoring routine is adapted to use the electrical operating parameters of the device to detect whether the device is operating in

accordance with the voltage current characteristic curve of the device. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claims 26, none of the prior art of record teaches or suggests the combination of a method of detecting cavitation within a device operating in a process, wherein the method comprising: collecting one or more operating parameters associated with the device during operation of the device; and automatically detecting the presence of cavitation within the device based on the one or more collected operating parameters, wherein the step of automatically detecting includes the step of using the characteristic curve; determining a net positive suction head available in the device; comparing the net positive suction head available with a net positive suction head required for the device. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claims 29, none of the prior art of record teaches or suggests the combination of a method of detecting cavitation within a device operating in a process, wherein the method comprising: collecting one or more operating parameters associated with the device during operation of the device; storing a characteristic curve for the device; and automatically detecting the presence of cavitation within the device based on the one or more collected operating parameters, wherein the step of storing a characteristic curve includes a step of storing a characteristic curve that defines a net

positive suction pressure required for the device. It is these limitations as they are claimed in the combination, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claims 30, none of the prior art of record teaches or suggests the combination of a method of detecting cavitation within a device operating in a process, wherein the method comprising: collecting one or more operating parameters associated with the device during operation of the device; storing a characteristic curve for the device; and automatically detecting the presence of cavitation within the device based on the one or more collected operating parameters, wherein the step of storing the characteristic curve includes the step of storing a voltage-current characteristic curve for the device, wherein the step of collecting includes the step of collecting one or more electrical operating parameters of the device and wherein the step of automatically detecting includes the step of using the electrical operating parameters of the device to detect whether the device is operating in accordance with the voltage-current characteristic curve of the device. It is these limitations as they are claimed in the combination, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 37, none of the prior art of record teaches or suggests the combination of a monitoring system for use in detecting the presence of cavitation within a device in a plant having a processor, wherein the monitoring system comprising: a collection routine stored in the memory and adapted to be executed on the processor to collect one or more operating parameters associated with the device during operation of

the device; and a monitoring routine stored in the memory and adapted to be executed on the processor to use the one or more operating parameters to estimate the presence of cavitation within the device, wherein a characteristic curve associated with the device is stored in the memory, and the monitoring routine is adapted to detect the degradation in performance based on the characteristic curve. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 44, none of the prior art of record teaches or suggests the combination of a field device for use in a process plant, wherein the field device comprising: a collection routine stored in the memory and adapted to be executed on the processor to collect one or more operating parameters associated with the process plant operation; and a monitoring routine stored in the memory and adapted to be executed on the processor to use the one or more operating parameters to estimate the presence of cavitation in the process plant; wherein the monitoring routine is adapted to use the operating parameters to detect a degradation in the operational performance of a device in the process plant to estimate the presence of cavitation within the process plant, a characteristic curve associated with the device is stored in the memory, and the monitoring routine is adapted to detect the degradation in performance based on the characteristic curve. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Response to Arguments

8. Applicant's arguments filed 02/05/2004 have been fully considered but they are not persuasive.

-Applicant argues that the prior art fails to teach or suggest "use of characteristic curve to estimate the presence of cavitation ".

Although March is silent on teaching of the claimed the characteristic curve to estimate the presence of cavitation within the device, it would have been obvious to one of ordinary skill to apply the characteristic curve to estimate the presence of cavitation within the device for the purpose of providing a system for monitoring and control of the operation of a turbine as intended since characterized by a series of curves showing hydraulic efficiency as a function of gate opening or output power for a series of heads representing the expected operating range, the sensors of control system 46 preferably permit detection of a set of operating parameters, including gross differential head from headwater 24 to tailwater 26, power generation level, flow through unit 18, cavitation, and trash rack head loss, such measurements are used to determine the drop in head across dam 12 and for determining the submersion factor of the turbine as an indication of the risk of cavitation within turbine 30, that some type of the characteristic curve to estimate the presence of cavitation within the device must be present for providing a system for monitoring and control of the operation of a turbine as intended.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John H Le whose telephone number is 571-272-2275. The examiner can normally be reached on 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E Barlow can be reached on 571-272-2269. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

John H. Le
Patent Examiner-Group 2863
May 27, 2004

MICHAEL NGHIEM
PRIMARY EXAMINER
5/27/04